

**REMARKS**

Applicants respectfully request reconsideration of the present application in view of the reasons that follow. Claims 1-40, 43, 44, 51, 52, 59, and 60 were canceled previously. Claims 41, 42, 45-50, 53-58, and 61-75 are pending in the present application.

**I. Claim Rejections Under 35 U.S.C. § 102**

In Section 3 of the Office Action, Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-65 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2006/0209982 to De Gaudenzi *et al.* (De Gaudenzi). Applicants respectfully traverse the rejection.

Claim 41 recites in part:

selecting a signal constellation from a plurality of signal constellations based on the determined characteristic, the selected signal constellation including a plurality of constellation points, the plurality of constellation points selected by maximizing a minimum Kullback-Leibler distance between the plurality of constellation points;

(Emphasis added through underlining). Though of different scope, Claims 49 and 57 recite similar features. The Examiner asserts that De Gaudenzi discloses a “signal constellation [that] is chosen so as to maximize a minimum geometrical distance between the pairs of points of the digital constellation.” The Examiner apparently is asserting that this disclosure anticipates the element of “the plurality of constellation points selected by maximizing a minimum Kullback-Leibler distance between the plurality of constellation points.”

Applicants respectfully disagree.

De Gaudenzi discloses that “[c]onstellation optimisation can be made by either maximizing the minimum constellation points distance or by determining the maximum channel capacity. The minimum distance between constellation points can be determined by simple geometrical calculations.” (Paras. [0053]-[0054]). According to De Gaudenzi, “the signal constellation parameters [are optimized] according to minimum Euclidean distance.” (Para. [0010]). De Gaudenzi only discloses maximizing the minimum geometric or Euclidian

distance. Nowhere does De Gaudenzi teach, suggest, or describe use of a Kullback-Leibler distance. Paragraph [0014] of the present application states:

The constellations of this invention exploit the statistics of the fading and estimation error, to jointly design constellations for MIMO systems. They use a design metric that is derived for the partially coherent scenarios (as opposed to using the conventional Euclidean design metric which is optimal only when receiver has perfect knowledge of the channel). As a result, they provide substantial performance gains over the conventional techniques in the presence of channel estimation errors as low as a few percent.

Thus, a Kullback-Leibler distance is not anticipated by the simple disclosure of “a geometrical distance” or a or Euclidian distance.

A 35 U.S.C. § 102 rejection cannot be properly maintained where the reference does not teach each and every element of at least Claims 41, 49, and 57. The remaining claims depend from one of Claims 41, 49, and 57. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 41, 42, 45, 49, 50, 53, 57, 58, and 61-65.

## **II. Claim Rejections Under 35 U.S.C. § 103**

In section 4 of the Office Action, Claims 46-48 and 54-56 were rejected under 35 U.S.C. § 103(a) as being unpatentable over De Gaudenzi in view of U.S. Patent No. 7,269,436 to Won (Won). Applicants respectfully traverse the rejection.

As discussed in section I. above, De Gaudenzi fails to teach all of the elements of at least Claims 41 and 49. Claims 46-48 depend from Claim 41. Claims 54-56 depend from Claim 49. Nowhere does Won teach, suggest, or describe use of a Kullback-Leibler distance. Therefore, De Gaudenzi and Won, alone and in combination, fail to teach each and every element of at least Claims 41 and 49.

Additionally, Claim 46 recites:

The method of claim 41, wherein selecting the signal constellation from the plurality of signal constellations is

further based on a number of transmit antennas used in transmitting the modulated carrier wave.

(Emphasis added through underlining). Claim 54 recites:

The device of claim 49, wherein the antenna comprises a plurality of transmit antennas, and wherein Selecting the signal constellation is further based on a number of the plurality of transmit antennas used in transmitting the signal.

(Emphasis added through underlining). On page 3 of the Office Action, the Examiner states that “De Gaudenzi does not disclose the number of transmit antennas is determined from a message received over the wireless channel.” Thus, the Examiner recognizes that De Gaudenzi does not teach the elements of Claims 46 and 54. The Examiner further asserts that:

Won discloses the transmitter can estimate the channel covariance matrix using a preamble transmitted from the receiver. The transmitter can also update the number of antennas and the power allocation according to the eigenvalues of the estimated covariance matrix (column 7, lines 42-48). Therefore, the number of transmit antennas is determined from the information in the preamble (header) of the received signal.

(Emphasis added through underlining). The Examiner’s conclusion that “the number of transmit antennas is determined from the information in the preamble” does not teach “selecting the signal constellation … based on a number of transmit antennas” as recited in Claims 46 and 54. In Won, the number of transmit antennas can be determined from the received signal; however, nowhere does Won disclose Selecting a signal constellation based on that number of transmit antennas. As such, Applicants respectfully submit that Won and De Gaudenzi further fail to teach, suggest, or describe each of the elements of at least Claim 46 and 54.

An obviousness rejection cannot be properly maintained where the references do not teach each and every element of the claims. Therefore, Applicants respectfully request withdrawal of the rejection of Claims 46 and 54 under 35 U.S.C. § 103(a). For at least the same reasons, Applicants respectfully request withdrawal of the rejection of Claims 47-48 and 55-56, which depend from Claims 46 and 54, respectively.

**III. Claims 66-75**

In the Disposition of Claims Section of the Office Action Summary, the Examiner asserts that Claims 66-75 are rejected. However, the Examiner fails to reference these claims elsewhere in the Office Action. As such, Applicants are unsure as to the reason for their rejection. However, Claims 66-75 depend from Claims 49 and 57. For at least the same reasons discussed in sections I. and II. above, Applicants respectfully request withdrawal of the rejection of Claims 66-75, which depend from one of Claims 49 and 57.

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extension of time is needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extension fees to Deposit Account No. 19-0741.

Respectfully submitted,

By



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